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combining with inflammable substances, producing light and heat.

2dly. That its combinations with inflammable bodies are analogous to oxides and acids in their properties, and powers of combination, but they differ from them in being for the most part decomposable in water.

3dly. That hydrogen is the basis of the muriatic acid, and oxymuriatic acid its acidifying principle.

4thly. That the compounds of phosphorus, arsenic, tin, &c. with oxymuriatic acid, approach in their nature to acids, and neutralize ammonia, and other salifiable bases.

5thly. That the combination of ammonia with phosphorus acidified by oxymuriatic acid, is a peculiar compound, having properties like those of an earth, and is not decomposable at an intense red heat.

6thly. That oxymuriatic acid has a stronger attraction for most inflammable bodies than oxygen; and that on the hypothesis of the connexion of electrical powers with chemical attractions, it must be highest in the scale of negative power; and that the oxygen, which has been supposed to exist in oxymuriatic acid has always been expelled by it from water or oxides.

The following errata arising from the original paper on this subject, are to be corrected in our last. p. 146, l. 43, for nine read nice, and l. 46, for nine read some.

On the Art of Printing on Stone, by G.O. Phil. Journal, xxvi. 317.

The following circumstances respecting the art of printing on stone, which seem of considerable utility, and which have not been noticed by M. De Serres, in the paper inserted in our former number, are mentioned by G.O.

He tried the ink made according to M. De Serres direction (which was considered so great a secret) but he prefers to it coloured turpentine, copal or lac varnish. Muriatic acid he finds preferable to the nitric, as it both has the advantage of not acting upon the resin or wax, which forms the base of the varnish used, and is cheaper.

After purchasing some pieces of

marble, he was very much vexed to find that both the muriatic and nitric acid left some veins untouched, and only partially dissolved others; this must be attended to in selecting the blocks. He finds some pieces of the limestone from Clifton near Bristol, take a tolerable polish, and dissolve readily.

He thinks Chavron's method, used on stone, or even on lead, to be the easiest and cheapest for those who wish to have a card or cyphers. &c. printed. A small piece may be executed in a quarter of an hour; and if wetting is not sufficient to prevent the ink from adhering to the block (in the spaces between the letters) it will bear sponging, and yet leave enough of the ink upon the figures.

Method of Increasing the Durability of Tiles; by Count Von Mellin.

Sonnen's Journal, Oct. 1803, p. 243.

Count Von Mellin thinking the method of increasing the hardness, and consequently the durability of tiles by glazing, not sufficiently cheap and simple for common use, though very effectual, resolved to try the effect of tarring the tiles, which he had heard recommended, on one of his roofs that required considerable repairs.

Having provided some of the largest brushes, he and an assistant set about coating the upper surface of the tiles with tar liquified over a gentle fire, and kept moderately hot. Four persons were employed to hand up the tiles, and when tarred, to lay them in the sun to dry; which took three or four days, it being then the spring of the year. The best of the tiles, or those which appeared most thoroughly baked were set apart (without being tarred) and the others were exposed to the sun, that they might be warmed and receive the coat of tar more easily. After the process these appeared as if coated with a reddish brown varnish. Four hours were sufficient for the preparation of two thousand.

Near the Count's house was a tile kiln, which was just ready to draw. As soon as it was sufficiently cool to allow the tiles to be handled, he had as many taken out, as left in the interior of the kiln, sufficient room

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for a few people to coat them with tar. While two of these were tarring the tiles, three others were employed to give them, receive them when tarred, and lay them in a corner of the kiln, where the heat was reduced to that of a vapour bath. When the kiln was quite cold the tiles were perfectly dried, but they had not such a shining coat as the former, because the great heat had caused the tar to penetrate their substance. Their pores were completely stopped, and they were rendered impenetrable to water. The five persons mentioned tarred four thousand tiles in six hours. Both these experiments did not consume a barrel of tar.

The roof for which these were used, is open to north, and exposed to all the violence of rains and storms. It was repaired in 1779, and not one of the tarred tiles is at all injured or decayed. They are covered with a very fine mass, and their surface is in as good condition as if the tar had been just laid on. On the other hand, several of those which had been set apart, supposing that they would resist the weather without any preparation, because they were thoroughly burned, are cracked, broken at the corners, or splintered on the surface.

Some persons think that tarred tiles would be the more durable, if they were powdered with iron filings and charcoal dust; but Count Von M. conceives that these substances would render the surface rough; and thus detain the water, while those coated with varnish would let it run off. He is of opinion however, that a mixture of lime and tar would be more beneficial, and thinks too that fats in general, whale oil, or the dregs of oil, would be equally adapted to the purpose, and still cheaper.

Observations....It is obvious that coal tar would do equally well as pine tar, for the purpose above mentioned, and be much cheaper, as has been remarked by the editor of the *Philosophical Journal*; coal tar will soon be easily procured, on account of the encased use of coal gas lights, in preparing which it is furnished in abundance, and which lights must, from their many advantages in time

supersede all other artificial lights for manufactories. The process recommended in this paper, must be also very beneficial for making bricks more durable in the fronts of new houses. But for the fronts of old houses, the method suggested by the Count at the end of his paper is preferable, as the oil would admit of the addition of red ochre, or some other colouring matter, so as to restore or improve the original colour of the brick work.

Letters respecting De Luc's Electric Column; by Mr. Forster.

Phil. Mag. xxxvi. 75.

Mr. Forster states that, "notwithstanding the changes which have happened in the state of the atmosphere, the small bells, which are in communication with De Luc's electric column, have continued to ring without ceasing from the 25th of March to the moment of inspection on the 23d of July. Although we have had of late heavy rain, accompanied with thunder and lightning, we have not had any very damp weather, which seems to be the most likely to stop the motion of the small clapper, by depositing moisture on the insulating parts of the apparatus. Mr. Forster mentions a mistake which he made in his first account of the electric column, (which is inserted in our 4th vol. p. 301) having there mis-called the ends of the column: as he has named that the zinc end, which should have been called the silver end, and the reverse. So that the effects on the electrometer of the coated jar, respecting the *plus* and *minus* states, were just what might have been imagined they would be. The mistake was owing to the silver and paper being connected together; for had the two metals been united, and the paper separate, the instrument would then have resembled more the usual construction of a galvanic trough; and Mr. F. would not then, he thinks, have been led into any error respecting the names of the ends or the poles of it.

M. De Luc has used paper covered with the copper foil, called Dutch gold, in his experiments, which though not so powerful as the silver